BALDOR®

ADJUSTABLE SPEED DRIVE

SERIES 5 MICRO INVERTER
NEMA-1 / IP-40

Installation and Operation Manual

For Catalog Number - ID5601- EO

MN785

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1 INTRODUCTION

Thank you for purchasing the Adjustable Frequency Drive, ID5601-EO. Baldor, Inc. is committed to providing total customer satisfaction by producing quality products that are easy to install and operate. The ID5601-EO is manufactured with surface mount components incorporating advanced circuitry and technology. The ID5601-EO is an Adjustable Frequency Drive which is capable of variable speed control. In addition, it is housed in a NEMA-1 / IP-40 enclosure. It is designed to operate 208 – 230 Volt 50 & 60 Hz 3-phase AC induction motors from 1/8 HP thru 1 HP. The sine wave coded Pulse Width Modulated (PWM) output operates at a carrier frequency of 16 kHz which provides high motor efficiency and low noise. Adjustable Linear Acceleration and Deceleration make the drive suitable for soft-start applications. The Motor Horsepower Selection Jumper allows the drive to be used on a wide range of motor horsepower (1/8, 1/4, 1/2, 3/4, 1 HP) without recalibration or programming.

Its user-friendly design makes the ID5601-EO easy to install and operate. Setting the drive to specific applications is accomplished with selectable jumpers and trimpots, which eliminates the computer-like programming required on other drives. However, for most applications no adjustments are necessary.

Main features include adjustable RMS Current Limit and I^2t Motor Overload Protection. [1] In addition, Adjustable Flux Vector Compensation with Static Auto-Tune and Boost provides high torque and excellent load regulation over a wide speed range. Power Start™ delivers over 200% motor torque to ensure startup of high frictional loads. Electronic Inrush Current Limit (EICL™) eliminates harmful AC line inrush current. A Run/Fault Relay is provided, which can be used to turn on or off equipment or to signal a warning if the drive is put into the Stop Mode or a fault has occurred.

Standard front panel features include an On/Off AC Line Switch, a pilot light for power on, and a Main Speed Potentiometer. Other features include PC board mounted diagnostic LEDs (Power On (ON), Drive Status (ST) and Overload (OL)), Barrier Terminal Blocks to facilitate wiring (AC line, motor, ground (earth), and Run/Fault Relay Output Contacts), adjustable trimpots (MIN, MAX, ACCEL, DECEL, COMP, CL), customer selectable jumpers (AC Line Input Voltage Selection, Motor Horsepower, Automatic or Manual Start and Reset [2], Motor Frequency, Frequency Multiplier, and a Run/Fault Output Relay). Refer to Tables 1 – 8, on pages 4, 5, and 6.

Optional accessories include: Forward-Stop-Reverse Switch.

Notes: **1.** UL approved as an electronic overload protector for motors. **2.** The optional Forward-Stop-Reverse Switch is required for Manual Start

CE This product complies with all CE directives pertinent at the time of manufacture. Contact your local Baldor District Office for Declaration of Conformity. Installation of a CE approved RFI filter is required. Additional shielded cable and/or AC line cables may be required along with a signal isolator.

TABLE 1 - STANDARD FEATURES

Feature	Description
Simple to Operate	Does not require programming. Uses trimpots and jumpers which are factory set for most applications.
Dual AC Line Voltage (115 or 208/230 Volt AC Operation)	Controls 208 – 230 Volt AC, 50 & 60 Hz, 3-phase motors from 115 or 208/230 Volt AC line. (Jumper J1 must be installed for 115 Volt AC line operation.)
Motor Horsepower Selection Jumper	Allows the drive to be used on a wide range of motor horsepower (1/8, 1/4, 1/2, 3/4, 1 HP) without recalibration or programming.
Diagnostic LED's	PC board mounted LEDs for Power on (ON), Drive Status (ST), and Overload (OL).
Run/Fault Relay Output Contacts	Can be used to turn on and off equipment or to signal a warning if the drive is put into a Stop Mode or a fault has occurred.
Barrier Terminal Blocks	Facilitate wiring of AC line, motor, ground (earth) and Run/Fault Relay Output Contacts.
On/Off AC Line Switch	Panel mounted. Used to turn on or off power to the drive.
Pilot Light	Panel mounted. Indicates that power is applied to the drive and the On/Off AC Line Switch is set to the "ON" position.
Main Speed Potentiometer	Panel mounted. Provides adjustment of motor speed.
Jumper Selections of Drive Output Frequency	Increases the motors speed up to two times the rated RPM.

TABLE 2 - PERFORMANCE FEATURES

Feature	Description
Power Start™	Provides more than 200% starting torque which ensures startup of high frictional loads.
Flux Vector Compensation with Static Auto-Tune and Boost	Provides excellent load regulation over a wide speed range.
Speed Range	60:1

TABLE 3 - PROTECTION FEATURES

Feature	Description
Motor Overload (I^2t) with RMS Current Limit	Provides motor overload protection which prevents motor burnout and eliminates nuisance trips*.
Electronic Inrush Current Limit (EICL™)	Eliminates harmful inrush AC line current during startup.
Short Circuit	Shuts down the drive if a short circuit occurs at the motor (phase-to-phase).
Regeneration	Eliminates tripping due to bus overvoltage caused by rapid deceleration of high internal loads.
Undervoltage and Overvoltage	Shuts down the drive if the AC line input voltage goes above or below the operating range.
MOV input transient suppression.	Prevents failure of power devices caused by voltage spikes in the AC line.
Microcontroller Feature	Self monitoring and auto-reboot.

** UL approved as an overload protector for motors.*

TABLE 4 – SELECTABLE JUMPERS (See Section 6, on page 19)

Feature	Description
AC Line Input Voltage Selection (115/230 Volts AC) J1. Refer to Section 6.1, page 19.	Factory set for 208/230 VAC (Install Jumper for 115 VAC Operation).
Motor Horsepower (1/8, 1/4, 1/2, 3/4, 1 HP) J2. Refer to Section 6.2, page 19.	Selectable for the motor use.
Automatic or Manual Start and Reset. J3. Refer to Section 6.3, page 19.	Factory set for Auto. Can be set for Automatic start or Manual start (Optional FSR Switch required).
Motor Frequency (50/60 Hz) J5. Frequency Multiplier (1X, 2X) J4. Refer to Sections 6.4.1 and 6.4.2, on page 20.	Factory set for 60 Hz. Must be set for the motor being used. In addition, the drive may be set for up to 2X the motors rated RPM.
"Run" or "Fault" Output Relay Operation. J6, Refer to Section 6.5, page 20.	Factory set to RUN position. Set to either Run or Fault for intended application.

TABLE 5 - TRIMPOT ADJUSTMENTS (See Section 7, on pages 21 – 24)

Trimpot	Description
Minimum Speed (MIN), Refer to Section 7.1, page 21.	Sets the minimum speed of the motor.
Maximum Speed (MAX), Refer to Section 7.2, page 22.	Sets the maximum speed of the motor.
Acceleration (ACCEL), Refer to Section 7.3, page 22.	Sets the amount of time for the motor to accelerate from zero speed to full speed.
Deceleration (DECEL), Refer to Section 7.4, page 22.	Sets the amount of time for the motor to decelerate from full speed to zero speed.
Slip Compensation (COMP) Refer to Section 7.5, page 22.	Sets the amount of Volts/Hz to maintain set motor speed under varying loads.
Current Limit (CL), Refer to Section 7.6, page 23.	Sets the current limit and limits the maximum current (torque) to the motor.

TABLE 6 - OPTIONAL ACCESSORY

Description	Catalog No.
Forward-Stop-Reverse Switch: Provides motor reversing, stop, and manual start functions.	ID5FRS-2

TABLE 7 - ELECTRICAL RATINGS

Catalog No.	AC Line Input		Fuse or Circuit Breaker Rating (Amps)	Output			Net Weight	
	Volts AC 50/60 HZ, (Phase Φ)	Maximum Current- (Amps AC)		Voltage Range (Volts AC) (Phase Φ)	Maximum Continuous Load Current (RMS Amps/ Phase)	Maximum Horsepower (HP(kW))	lbs.	kg
ID5601 - EO	115, 1 Φ	16.0	20	0 – 230 3 Φ	3.6	1 (.75)	2.42	1.09
	208/230[1], 1 Φ	10.0	15					

Note: 1. *The drive is factory set for 208/230 Volt AC line input (J1 not installed). For 115 volt AC line input, install Jumper J1 (supplied). See Section 6.1, on page 19.*

TABLE 8- GENERAL PERFORMANCE SPECIFICATIONS

Description	Specification	Factory Setting
115 Volt AC Line Input Voltage Operating Range (Volts AC)[1]	115 (±15%)	—
208/230 Volt AC Line Input Voltage Operating Range (Volts AC)[1]	208 (-15%) / 230 (+15%) [2]	—
Maximum Load (% Current Overload for 1 Minute)	150	—
Horsepower Selection (HP) (Jumper J2)	1/8, 1/4, 1/2, 3/4, 1	1
Carrier Frequency (kHz)	16	—
Output Frequency Resolution (Bits)	10	—
Minimum Speed Trimpot (MIN) Range (% Frequency Setting)	0 – 40	0
Maximum Speed Trimpot (MAX) Range (% Frequency Setting)	70 – 110	100
Acceleration Trimpot (ACCEL) and Deceleration Trimpot (DECEL) Range (Seconds)	.3 – 20	1.5
Slip Compensation Trimpot (COMP) Range at Drive Rating (Volts/Hz)	0 – 3	1.5
Current Limit Trimpot (CL) Range (% Full Load)	0 – 200	160
Motor Frequency Setting (Hz) (Jumper J5)	50, 60	60
Output Frequency Multiplier (1X, 2X) (Jumper J4)[3]	1, 2	1
Minimum Operating Frequency at Motor (Hz)	0.3	—
Speed Range (Ratio)	60:1	—
Speed Regulation (30:1 Speed Range, 0 – Full Load) (% Base Speed)[4]	2.5	—
Overload Protector Trip Time for Stalled Motor (Seconds)	6	—
Undervoltage/Overvoltage Trip Points for 115 Volt AC Line Input (±5%) (Volts AC)[1]	76 / 141	—
Undervoltage/Overvoltage Trip Points for 208/230 Volt AC Line Input (±5%)	151 / 282	—
Run/Fault Relay Output Contact Rating (Amps at 30 Volts DC, 125 Volts AC, 230 Volts AC)	1, 0.5, 0.25	—
Operating Temperature Range (°C / °F)	0 – 40 / 32 – 104	—

Notes: 1. *Do not operate the drive outside the specified AC line input voltage operating range.* ***2.*** *The drive is factory set for 208/230 Volt AC line input (Jumper J1 not installed). For 115 Volt AC line input, install Jumper J1 (supplied). See Figure 3, on page 12.* ***3****. Allows the motor to operate up to two times the rated RPM. Constant motor horsepower will result when operating the drive in the "2X" mode above the motor rated frequency.* ***4****. Dependant on motor performance.*

SAFETY NOTICE

WARNING - STATEMENT INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN INJURY OR DEATH.

CAUTION - Statement indicates a potentially hazardous situation which, If not avoided, could result in damage to property.

Note - Additional information that is not critical to the installation or operation.

WARNING! READ ALL SAFETY WARNINGS, ON PAGE 8, BEFORE USING THE DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. TO AVOID ELECTRIC SHOCK, BE SURE TO PROPERLY GROUND THE DRIVE.

WARNING! THIS EQUIPMENT MAY CONTAIN VOLTAGES AS HIGH AS 1000 VOLTS! ELECTRICAL SHOCK CAN CAUSE SERIOUS OR FATAL INJURY. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT THE START-UP PROCEDURE OR TROUBLESHOOT THIS EQUIPMENT.

WARNING! ELECTRICAL SHOCK CAN CAUSE SERIOUS OR FATAL INJURY. BE SURE THAT ALL POWER IS DISCONNECTED FROM DRIVE BEFORE THE COVER IS OPENED. OPENING OF THE COVER IS REQUIRED TO MAKE INSTALLATION CONNECTIONS. ELECTRICAL SHOCK CAN CAUSE SERIOUS OR FATAL INJURY IF THE COVER IS REMOVED AND POWER IS STILL APPLIED.

WARNING! ELECTRICAL SHOCK CAN CAUSE SERIOUS OR FATAL INJURY. VERIFY THERE IS NO VOLTAGE PHASE-TO-PHASE OR PHASE-TO-NEUTRAL AT THE AC LINE CONDUCTORS BEFORE TOUCHING THE AC INPUT WIRES. DO NOT TOUCH LIVE WIRES. ALL POWER MUST BE DISCONNECTED BEFORE PROCEEDING.

WARNING! IT IS THE RESPONSIBILITY OF THE EQUIPMENT MANUFACTURER AND INDIVIDUAL INSTALLER TO SUPPLY THIS SAFETY WARNING TO THE ULTIMATE END USER OF THIS PRODUCT. (SW/FSC 5/2005) BE SURE TO FOLLOW ALL INSTRUCTIONS CAREFULLY. FIRE AND/OR ELECTROCUTION CAN RESULT DUE TO IMPROPER USE OF THIS PRODUCT.

WARNING! DO NOT USE THIS DRIVE IN AN EXPLOSIVE ENVIRONMENT. AN EXPLOSION CAN CAUSE SERIOUS OR FATAL INJURY. THIS DRIVE IS NOT EXPLOSION PROOF.

SAFETY NOTICE(Continued)

WARNING! HIGH VOLTAGE IS PRESENT IN THIS DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. THE COVER MUST BE PROPERLY INSTALLED AFTER ALL SETUP, CONNECTIONS, AND ADJUSTMENTS ARE COMPLETE. IT REDUCES ELECTRICAL SHOCK HAZARD. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN ELECTRICAL SHOCK OR ELECTROCUTION.

WARNING! HIGH VOLTAGE IS PRESENT IN THE DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. DO NOT ADJUST TRIMPOTS WITH THE MAIN POWER APPLIED. IF ADJUSTMENTS ARE MADE WITH THE MAIN POWER APPLIED, AN INSULATED ADJUSTMENT TOOL (PROVIDED) MUST BE USED AND SAFETY GLASSES MUST BE WORN. FIRE AND/OR ELECTROCUTION CAN RESULT IF CAUTION IS NOT EXERCISED.

WARNING! HIGH VOLTAGE IS PRESENT IN THIS DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. TO PREVENT ACCIDENTAL CONTACT WITH HIGH VOLTAGE, IT IS REQUIRED THAT THE COVER BE PROPERLY INSTALLED AFTER ALL SETUP, CONNECTIONS, AND ADJUSTMENTS ARE COMPLETE. THIS REDUCES ELECTRICAL SHOCK HAZARD. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN ELECTRICAL SHOCK OR ELECTROCUTION.

WARNING! AUTOMATIC START AND RESET: JUMPER J3 IS FACTORY SET TO THE "AUTO" POSITION TO AUTOMATICALLY START THE DRIVE WHEN THE POWER IS APPLIED AND THE ON/OFF AC LINE SWITCH IS SET TO THE "ON" POSITION.

WARNING! THE DRIVE WILL AUTOMATICALLY RESTART AFTER FAULT HAS CLEARED. IF AN I^2T OR SHORT CIRCUIT FAULT OCCURS, THE DRIVE MUST BE RESTARTED BY SETTING THE ON/OFF AC LINE SWITCH TO THE "OFF" POSITION FOR A MINIMUM OF 5 SECONDS.

WARNING! DO NOT DEPEND ON THE PILOT LIGHT OR THE PC BOARD MOUNTED LED's FOR A GUARANTEED POWER OFF INDICATION. BE SURE ALL AC POWER IS "OFF" BEFORE SERVICING THE DRIVE TO AVOID ELECTRICAL SHOCK HAZARD.

WARNING! MAKE SURE THAT THE POTENTIOMETER IS SET FULLY COUNTERCLOCKWISE PRIOR TO APPLYING POWER. IF THIS IS NOT DONE, THE MOTOR WILL RUN AT THE SPEED SETTING AT POWER UP. THIS MAY CAUSE BODILY INJURY IF ONE IS IN CLOSE PROXIMITY OF MOVING PARTS.

SAFETY NOTICE (Continued)

CAUTION! 1. Some motors have low speed characteristics, which cause overheating and winding failure under light load or no load conditions. If the motor is operated in this manner for an extended period of time, it is recommended that the unloaded motor current be checked from 2 - 15 hz (60 - 450 rpm) to ensure motor current does not exceed the nameplate rating. Do not use motor if the motor current exceeds the nameplate rating. 2. It Is Recommended that the Drive be used with Inverter Duty or TENV Motors.

CAUTION! Disconnect motor leads (U, V and W) from control before performing a "Leakage Resistance" test on the motor. Failure to disconnect motor from the control may result in extensive damage to the control. The control is tested at the factory for high voltage / leakage resistance as part of Underwriter Laboratory requirements.

CAUTION! Suitable for use on a circuit capable of delivering not more than 5,000 RMS symmetrical short circuit amperes listed here at rated voltage.

CAUTION! Proper shielding, grounding, and filtering of this product can reduce the emission of radio frequency interference (RFI) which may adversely affect sensitive electronic equipment.

CAUTION! Do not use the "115V" position for 230 Volt AC line input voltage. Damage will occur to the drive. The 115V position provides 2 times the AC input voltage to the motor.

CAUTION! GFCI Operation: Do Not Connect This Drive To An AC Power Source Controlled By A Ground-Fault circuit-Interrupter.

CAUTION! If the current limit is adjusted above 160% of the motor nameplate rating, this can cause overheating of the motor.

CAUTION! Do not leave the motor in a locked rotor condition for more than a few seconds since damage may occur.

2 QUICK-START INSTRUCTIONS

Important: You must read these simplified instructions before proceeding. These instructions are to be used as a reference only and are not intended to replace the details provided herein. You must read the "ALL" Safety Warnings on, page 8, before proceeding.

Note: *This drive contains bus capacitors which must be reconditioned if the drive has been in storage for over 1 year. To recondition the bus capacitors, apply the AC line, with the main speed potentiometer set to zero, for a minimum of 30 minutes.*

See Figures 1 – 4, on pages 11 - 14. See Section 5 - Important Application Information, on page 17.

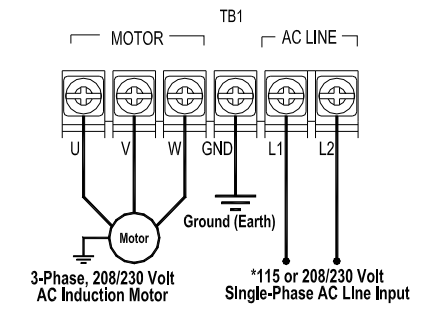
WARNING! HIGH VOLTAGE IS PRESENT IN THIS DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. TO PREVENT ACCIDENTAL CONTACT WITH HIGH VOLTAGE, IT IS REQUIRED THAT THE COVER BE PROPERLY INSTALLED AFTER ALL SETUP, CONNECTIONS, AND ADJUSTMENTS ARE COMPLETE. THIS REDUCES ELECTRICAL SHOCK HAZARD. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN ELECTRICAL SHOCK OR ELECTROCUTION.

Note: *It is recommended that both Feed-Through Bushings (See Figure 4, on page 13) be used to connect the drive. If signal wiring (for the Run/Fault Relay Output Contacts or for a remote Main Speed Potentiometer) is required, it is recommended that the extra Feed-Through Bushing (supplied with the drive) be used to replace the center Hole Plug. Standard 3/4" fittings (not supplied) can also be used in lieu of the Feed-Through Bushings.*

2.1 MOUNTING INSTRUCTIONS: See Section 3, on page 15.

WARNING! DO NOT USE THIS DRIVE IN AN EXPLOSION-PROOF APPLICATION.

FIGURE 1 - QUICK-START CONNECTION DIAGRAM



***For 115 VAC line, install jumper J1 (supplied).**

Recommended Tightening Torque
lb-in (7), kg-cm (8)

2.2 AC LINE INPUT CONNECTION: Connect the single-phase AC line input to Terminal Block TB1 (Terminals "L1", "L2"), as shown in Figure 1. See Section 4.1, on page 15.

Application Note: Do not connect this drive to a GFCI.

Note: *The drive is factory set for 208/230 Volt AC line input (Jumper J1 not installed). For 115 Volt AC line input, install Jumper J1 (supplied). See Section 6.1, on page 19.*

2.3 AC LINE FUSING: It is recommended that a fuse(s) or circuit breaker be installed in the AC line. Fuse each conductor that is not at ground potential. For the recommended fuse size, see Table 7, on page 5. Also see Section 4.1, on page 15.

2.4 GROUND CONNECTION: Connect the ground wire (earth) to Terminal Block TB1 (Terminal "GND"), as shown in Figure 1 and Table 9, on page 15.

2.5 MOTOR CONNECTION: Connect the motor to Terminal Block TB1 (Terminals "U", "V", "W"), as shown in Figure 1, on page 10. (Load reactors may be required for cable lengths over 100 ft. (30 m) – contact the local Baldor District Office). See Section 4.3, on page 16.

2.6 JUMPER SETTINGS: All jumpers have been factory set for most applications, as shown in Figure 3, on page 10. Some applications require setting of the jumpers in order to set the drive for a specific application. **Jumper J2 must be set to match the horsepower of the motor being used.** Refer to Table 4, on page 5 and Section 6, on pages 19 - 21.

2.7 60 Hz and 50 Hz MOTOR OPERATION: The drive is factory set for 60 Hz motor operation (Jumper J5 set to the "60Hz" position). See Section 6.4, on page 20.

2.8 PILOT LIGHT: After applying power to the drive and setting the On/Off AC Line Switch to the "ON" position, the panel mounted Pilot Light will illuminate.

2.9 DIAGNOSTIC LEDs: After applying power to the drive and setting the On/Off AC Line Switch to the "ON" position.

2.10 TRIMPOT SETTINGS: All trimpots have been factory set for most applications, as shown in Figure 3, on page 13. Some applications require adjustment of the trimpots in order to setup the drive for a specific requirement. See Section 7, on page 21.

FIGURE 2 – COVER LAYOUT

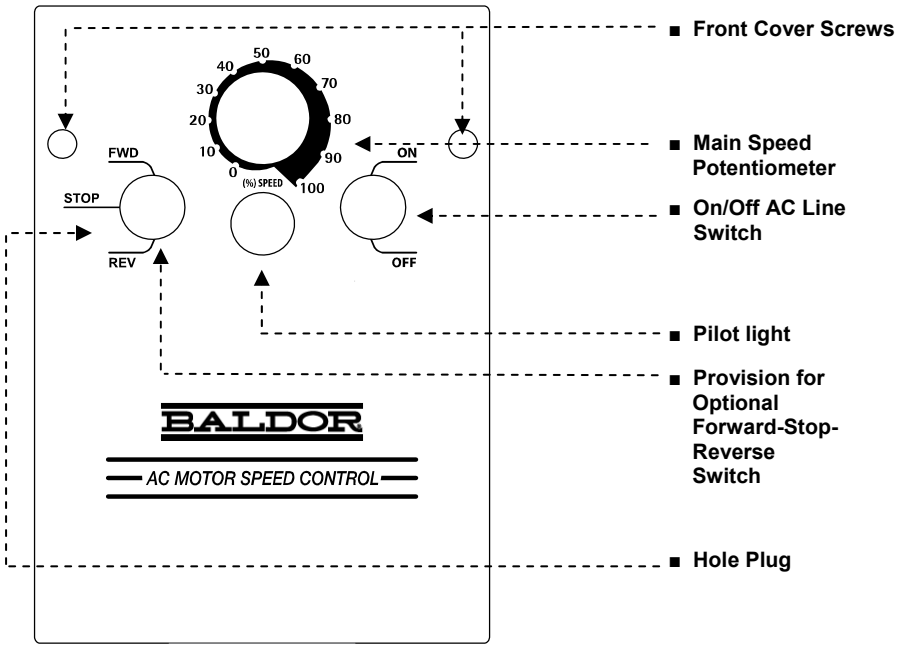


FIGURE 3 – DRIVE LAYOUT

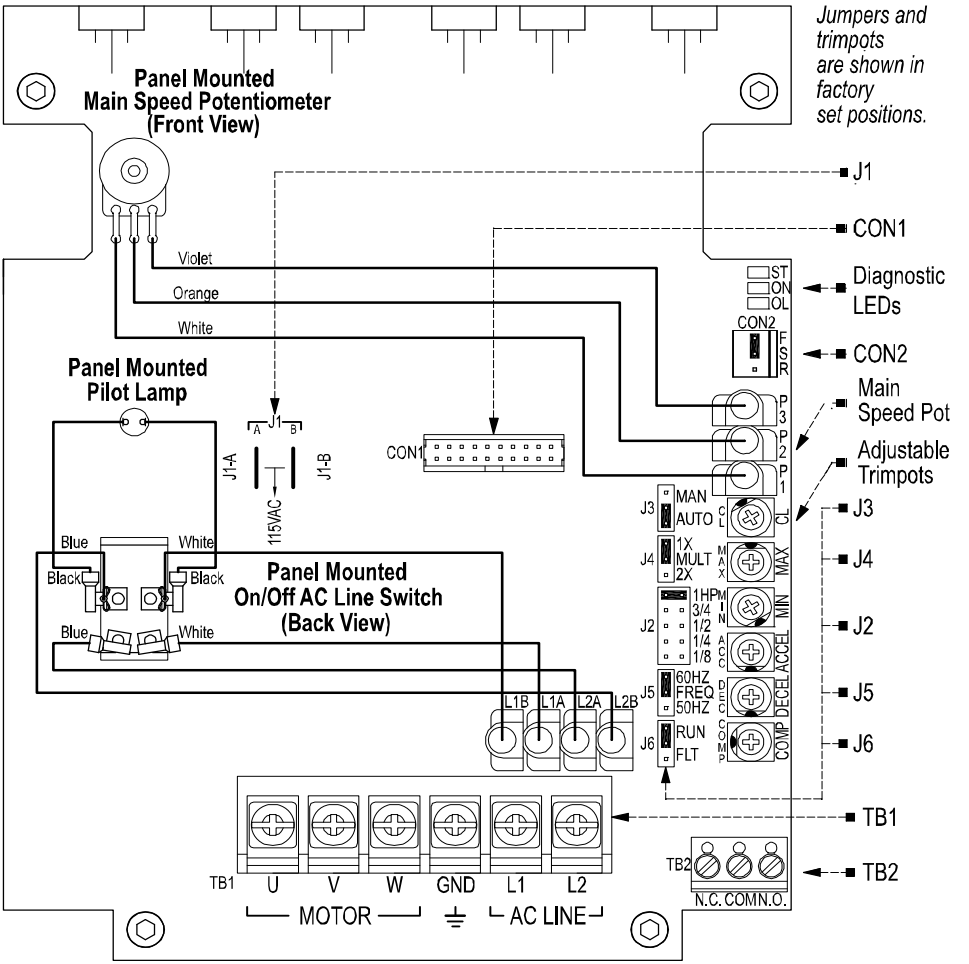
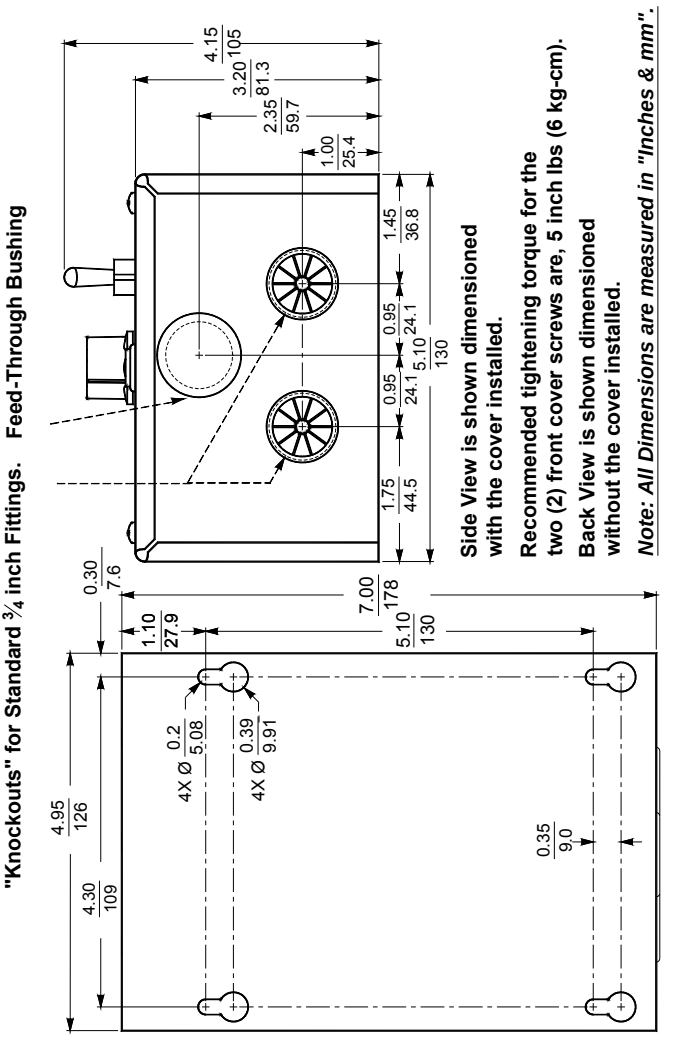


FIGURE 4 – MECHANICAL SPECIFICATIONS (INCHES/MM)


"Knockouts" for Standard ¾ inch Fittings. Feed-Through Bushing
Side View is shown dimensioned with the cover installed.
Recommended tightening torque for the two (2) front cover screws are, 5 inch lbs (6 kg-cm).
Back View is shown dimensioned without the cover installed.
Note: All Dimensions are measured in "Inches & mm".

3 MOUNTING INSTRUCTIONS

The drive is designed with a NEMA-1 / IP-40 enclosure for indoor use. It is recommended that the drive be mounted vertically on a flat surface with adequate ventilation. Leave enough room below the drive to allow for AC line, motor connections, and any other wiring that is required. Care should be taken to avoid extreme hazardous locations where physical damage can occur. When mounting the drive in an enclosure, the enclosure should be large enough to allow for proper heat dissipation so that the ambient temperature does not exceed 45°C (113 °F) at full rating. A mounting template is included to facilitate mounting of the drive. See Figure 4, on page 14.

The drive is designed with a removable cover. To open the cover, the two front cover screws must be removed. After mounting and connections, install and tighten the two front cover screws to 5 lbs-in (6 kg-cm). Do not overtighten.

4 ELECTRICAL CONNECTIONS

See Table 9, on page 14 for terminal block wire and tightening torque specifications.

WARNING! READ ALL SAFETY WARNINGS, ON PAGE 8, BEFORE USING THE DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. TO AVOID ELECTRIC SHOCK, BE SURE TO PROPERLY GROUND THE DRIVE.

Application Note: To insure proper operation, position and separate the AC line and motor connections, signal connections, signal following circuitry, or start/stop contacts. Also, do not combine (or in close proximity) motor wires from multiple drives in the same conduit. Use shielded cables on all signal wiring over 12" (30 cm). The shield should be earth grounded on the drive side only. Connect the drive in accordance with the National Electrical Code requirements and other local codes that may apply.

Be sure to properly fuse each AC line conductor that is not at ground potential. Do not fuse neutral or grounded conductors. A separate AC line switch or contactor must be connected as a disconnect, so that each ungrounded conductor is opened. For fuse or circuit breaker rating, see Table 7, on page 6. Also see Section 4.1.

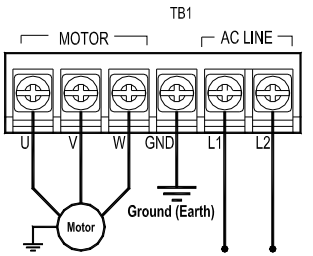
TABLE 9 - TERMINAL BLOCK WIRE AND TIGHTENING TORQUE SPECIFICATIONS

Terminal Block	Description	Maximum Wire Size (Copper) Insulation (75°C)		Recommended Tightening Torque	
		AWG	mm^2	lb-in	kg-cm
TB1	AC Line Input and Motor Wiring	12	3.3	7	8
TB2	Run/Fault Relay Output Contacts	16	1.3	3.5	3

4.1 AC LINE INPUT CONNECTION: Connect the single-phase AC line input to Terminal Block TB1 (Terminals “L1”, “L2”). See Figure 5, on page 16.

The rated AC line voltage of the drive must match the actual AC line input voltage setting of Jumper J1. The drive is factory set for 208/230 Volt AC line input (Jumper J1 not installed). For 115 Volt AC line input, install Jumper J1 (supplied). See Section 6.1, on page 17.

FIGURE 5 – AC LINE INPUT, MOTOR AND CONNECTIONS



CAUTION! GFCI Operation: Do Not connect this drive to an AC power source controlled by a Ground-Fault Circuit-Interrupter.

4.1.1 AC Line Fusing: The drive does not contain line fuses. Most electrical codes require that each ungrounded conductor contain circuit protection. Do not fuse neutral or ground connections. It is recommended to install a fuse (Littelfuse 326, Buss ABC, or equivalent) or a circuit breaker in series with each ungrounded conductor. Connect the drive in accordance with the National Electrical Code requirements and other local codes that may apply to the application. Do not fuse motor leads. For the recommended fuse size, see Table 7, on page 6.

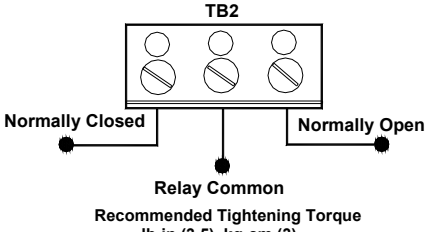
4.2 GROUND CONNECTION: Connect the ground (earth) wires from the AC line and motor to Terminal Block TB1 (Terminal "GND"). See Figure 5.

4.3 MOTOR CONNECTION: Connect the motor to Terminal Block TB1 Terminals "U", "V", and "W". See Figure 6. Motor cable length should not exceed 100 ft (30 m) – special reactors may be required – consult our Sales Department. Be sure Jumper J2 is set to the corresponding motor horsepower rating, as described in Section 7.2, on page 22.

Note: *If the motor rotates in the incorrect direction, it will be necessary to disconnect the AC line and change the position of the jumper on CON2 from "F" to "R" or reverse any two motor leads.*

4.4 RUN/FAULT RELAY CONNECTION: The Run/Fault Relay Output Contacts are located at TB2 and can be used to turn on or off equipment or to signal a warning if a fault has occurred or the drive is put into the Stop Mode*. See Figure 6. The Run/Fault Relay Contact status for various drive operating conditions is shown in Table 10. Also see Section 6.5, on page 19.

FIGURE 6 - RUN/FAULT RELAY OUTPUT CONNECTIONS



Relay Contacts Ratings: 1 Amp at 30 Volts DC, 0.5 Amps at 125 Volts AC, and 0.25 Amps at 250 Volts AC.

**In order for the Run/Fault Relay to give "Stop Mode" indication, the optional Forward-Stop-Reverse Switch (Catalog No.ID5FRS-2) must be installed.*

TABLE 10 - DRIVE OPERATING CONDITION AND RUN/FAULT RELAY CONTACT STATUS

Drive Operating Condition	Description	Run Relay Operation (J5 Installed in "RUN" Position) (Factory Setting)		Fault Relay Operation (J5 Installed in "FLT" Position)	
		Normally Open Contact	Normally Closed Contact	Normally Open Contact	Normally Closed Contact
Power Off	Main Power Disconnected	Open	Closed	Open	Closed
Run Mode[1]	Normal Drive Operation	Closed	Open	Closed	Open
Stop Mode[2]	Selected by Operator	Open	Closed	Closed	Open
Fault[3]	Drive Tripped	Open	Closed	Open	Closed

Notes: 1. *Run Mode is selected with the optional Forward-Stop-Reverse Switch or with the jumper installed in CON2 (jumper installed in the "F-S" position for forward direction (factory setting) or jumper installed in the "R-S" position for reverse direction).* ***2.*** *Stop Mode is selected using the optional Forward-Stop-Reverse Switch.****3.*** *I^2t, Short Circuit, Undervoltage, Overvoltage.*

5 IMPORTANT APPLICATION INFORMATION

⚠ **WARNING! Do not use this drive in an explosion-proof application.**

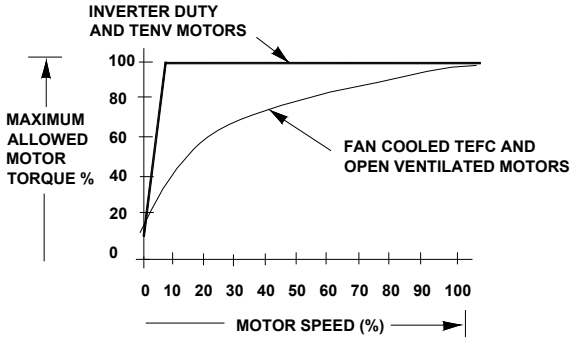
5.1 MOTOR WITH EXTERNAL FAN COOLING: Most totally enclosed fan-cooled (TEFC) and open ventilated 3-phase AC induction motors will overheat if used beyond a limited speed range at full torque. Therefore, it is necessary to reduce motor load as speed is decreased.

CAUTION! 1. Some motors have low speed characteristics, which cause overheating and winding failure under light load or no load conditions. If the motor is operated in this manner for an extended period of time, it is recommended that the unloaded motor current be checked from 2 - 15 hz (60 - 450 rpm) to ensure motor current does not exceed the nameplate rating. Do not use motor if the motor current exceeds the nameplate rating. 2. It Is Recommended that the Drive be used with Inverter Duty or TENV Motors.

Note: *Some fan-cooled motors can be used over a wider speed range. Consult your Baldor District Office for details.*

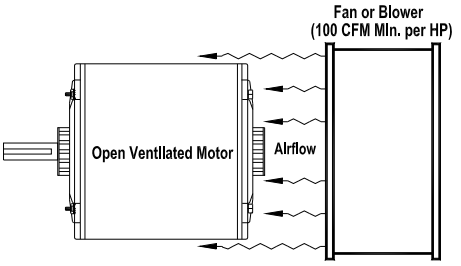
Inverter duty and most totally enclosed non-ventilated (TENV) motors can provide full rated torque over an extended speed range without overheating. See Figure 7 on page 18.

FIGURE 7 – MAXIMUM ALLOWED MOTOR TORQUE vs. SPEED



If external fan cooling is provided, open ventilated motors can also achieve an extended speed range at full rated torque. A box fan or blower with a minimum of 100 CFM per HP is recommended. Mount the fan or blower so the motor is surrounded by the airflow. See Figure 8.

FIGURE 8 - OPEN VENTILATED MOTOR WITH EXTERNAL FAN COOLING



5.2 ELECTRONIC MOTOR OVERLOAD PROTECTION: The drive contains Modified I^2t Overload Protection.* Part of this function consists of a Current Limit (CL) circuit, which limits the drive current to a factory preset level of 160% of the rated drive current. The CL Trimpot is used to recalibrate the drive current from 60% thru 200%. The Power Start™ circuit provides an overshoot function that allows most motors to develop more than 200% of starting torque.

Standard I^2t is undesirable because it causes nuisance tripping. It allows a very high motor current to develop and will turn the drive off after a short period of time. The RMS Current Limit Circuit avoids this nuisance tripping while providing maximum motor protection.

If the motor is overloaded to 120% of full load (75% of the CL setting), the I^2t Timer starts. If the motor continues to be overloaded at the 120% level, the timer will shut down the drive after 30 minutes. If the motor is overloaded to 160% of full load, the drive will trip in 6 seconds. See Section 7.6, on page 23.

*****UL approved as an overload protector for motors.*

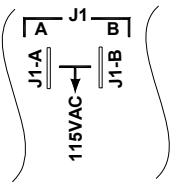
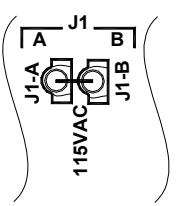
6 SETTING SELECTABLE JUMPERS

WARNING! ELECTRICAL SHOCK CAN CAUSE SERIOUS OR FATAL INJURY. BE SURE THAT ALL POWER IS DISCONNECTED FROM DRIVE BEFORE THE COVER IS OPENED. OPENING OF THE COVER IS REQUIRED TO MAKE INSTALLATION CONNECTIONS. ELECTRICAL SHOCK CAN CAUSE SERIOUS OR FATAL INJURY IF THE COVER IS REMOVED AND POWER IS STILL APPLIED.

The drive has customer selectable jumpers which must be set before the drive can be used. For an overview, see Table 4, on page 5. For location of jumpers, see Figure 3, on page 12.

6.1 AC LINE INPUT VOLTAGE (J1): The drive is factory set for 208/230 Volt AC line input (Jumper J1 not installed). For 115 Volt AC line input, install Jumper J1. See Figure 9.

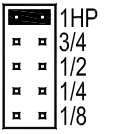
FIGURE 9 – AC LINE INPUT VOLTAGE SELECTION[1]

208/230 Volt AC Line Input (J1 not Installed (Factory Setting))	**115 Volt AC Line Input** (J1 Installed)[2]
	

Notes: 1. *The drive is factory set for 208/230 Volt AC line input (Jumper J1 not installed). For 115 Volt AC line input, install Jumper J1 (supplied).* ***2.*** *Jumper J1 is supplied in the hardware bag.*

6.2 MOTOR HORSEPOWER (J2): Set Jumper J2 to the corresponding position for the motor being used. See Figure 10.

FIGURE 10 - MOTOR HORSEPOWER SELECTION



6.3 AUTOMATIC OR MANUAL START AND RESET SELECTION (J3): See Figure 11, on page 20.

WARNING! AUTOMATIC START AND RESET: JUMPER J3 IS FACTORY SET TO THE "AUTO" POSITION TO AUTOMATICALLY START THE DRIVE WHEN THE POWER IS APPLIED AND THE ON/OFF AC LINE SWITCH IS SET TO THE "ON" POSITION.

WARNING! THE DRIVE WILL AUTOMATICALLY RESTART AFTER FAULT HAS CLEARED. IF AN I^2T OR SHORT CIRCUIT FAULT OCCURS, THE DRIVE MUST BE RESTARTED BY SETTING THE ON/OFF AC LINE SWITCH TO THE "OFF" POSITION FOR A MINIMUM OF 5 SECONDS.

6.3.1 Manual Start and Reset*: In Manual Start Mode, the drive must be manually restarted, after a fault has cleared, using the optional Forward-Stop-Reverse Switch. If a Short Circuit or I^2t Fault occurs, the drive can be restarted by setting either the On/Off AC Line Switch to the "OFF" position for a minimum of 5 seconds or setting the Forward-Stop-Reverse Switch to the "STOP" position.

***Note:** The optional Forward-Stop-Reverse Switch must be installed in order to use the drive for Manual Start operation.*

FIGURE 11 - AUTOMATIC OR MANUAL START AND RESET SELECTION

Automatic Start and Reset (Factory Setting) (J3 Installed in "AUTO" Position)	**Manual Start and Reset** (J3 Installed in "MAN" Position)

6.4 60 Hz OR 50 Hz MOTOR OPERATION AND DRIVE OUTPUT FREQUENCY (J4 AND J5): Both jumpers must be set for the appropriate motor nameplate frequency rating.

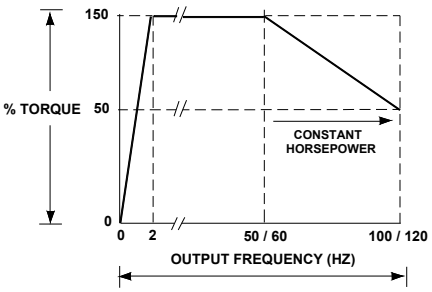
6.4.1 Setting the Drive for 60 Hz or 50 Hz Motor Operation: The drive is factory set to operate 60 Hz motors. Jumper J5 is factory set to the "60Hz" position. For 50 Hz motors, set Jumper J5 to the "50Hz" position, and be sure Jumper J4 is set to the "1X" position. See Figure 12.

FIGURE 12 - 60 HZ OR 50 HZ MOTOR SELECTION

60 Hz Motor Operation (Factory Setting) (J4 Installed in "1X" Position) (J5 Installed in "60Hz" Position)		**50 Hz Motor Operation** (J4 Installed in "1X" Position) (J5 Installed in "50Hz" Position)	

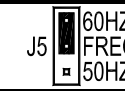
6.4.2 Setting the Drive for Two Times the Rated Motor RPM: The drive can also be used to operate the motor up to two times the rated RPM. However, constant horsepower will result when operating the drive in the "2X" mode above the motor rated frequency. See Figure 13.

FIGURE 13 – AVAILABLE TORQUE vs OUTPUT FREQUENCY



For 120 Hz output with 60 Hz motor, set Jumper J4 to the "2X" position and be sure Jumper J5 is set to the "60Hz" position. For 100 Hz output with 50 Hz motor, set Jumper J4 to the "2X" position and set Jumper J5 to the "50Hz" position. See Figure 14.

FIGURE 14 – 120 Hz AND 100 Hz DRIVE OUTPUT FREQUENCY SELECTION

120 Hz Output with 60 Hz Motor (J4 Installed in "2X" Position) (J5 Installed in "60Hz" Position)		**100 Hz Output with 50 Hz Motor** (J4 Installed in "2X" Position) (J5 Installed in "50Hz" Position)	
			

6.5 RUN/FAULT OUTPUT RELAY OPERATION (J6): Jumper J6 is factory set to the "RUN" position for "Run" operation of the Run/Fault Relay. For "Fault" operation of the Run/Fault Relay, set Jumper J6 to the "FLT" position. See Figure 15.

FIGURE 15 - "RUN" OR "FAULT" OUTPUT RELAY OPERATION SELECTION

"Run" Output Relay Operation (Factory Setting) (J6 Installed in "RUN" Position)	**"Fault" Output Relay Operation** (J6 Installed in "FLT" Position)

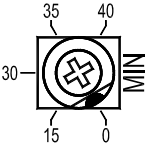
7 TRIMPOT ADJUSTMENTS

The drive contains trimpots that are factory set for most applications. See Figure 3, on page 12, for the location of the trimpots and their approximate factory calibrated positions. Some applications may require readjustment of the trimpots in order to set the drive for a specific requirement. The trimpots may be readjusted as described.

WARNING! IF POSSIBLE, DO NOT ADJUST TRIMPOTS WITH THE MAIN POWER APPLIED. IF ADJUSTMENTS ARE MADE WITH THE MAIN POWER APPLIED, AN INSULATED ADJUSTMENT TOOL MUST BE USED AND SAFETY GLASSES MUST BE WORN. HIGH VOLTAGE EXISTS IN THIS DRIVE. FIRE AND/OR ELECTROCUTION CAN RESULT IF CAUTION IS NOT EXERCISED. "ALL" SAFETY WARNINGS ON, PAGE 8, MUST BE READ AND UNDERSTOOD BEFORE PROCEEDING.

7.1 MINIMUM SPEED (MIN): Sets the minimum speed of the motor. The MIN Trimpot is factory set to 0% of frequency setting. For a higher minimum speed, setting, rotate the MIN Trimpot clockwise. See Figure 16.

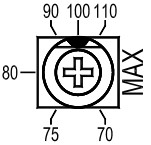
FIGURE 16 - MINIMUM SPEED TRIMPOT RANGE



(Shown Factory Set to 0% Frequency Setting)

7.2 MAXIMUM SPEED (MAX): Sets the maximum speed of the motor. The MAX Trimpot is factory set for 100% of frequency setting. For a lower maximum speed setting, rotate the MAX Trimpot, counterclockwise. For a higher maximum speed setting, rotate the MAX Trimpot clockwise. See Figure 17.

FIGURE 17 - MAXIMUM SPEED TRIMPOT RANGE

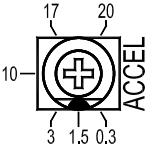


(Shown Factory Set to 100% of Frequency Setting)

7.3 ACCELERATION (ACCEL): Sets the amount of time for the motor to accelerate from zero speed to full speed. The ACCEL Trimpot is factory set to 1.5 seconds. For a longer acceleration time, rotate the ACCEL Trimpot clockwise. For more rapid acceleration, rotate the ACCEL Trimpot counterclockwise. See Figure 18.

Note: *Rapid acceleration settings may cause the current limit circuit to activate, which will extend the acceleration time.*

FIGURE 18 - ACCELERATION TRIMPOT RANGE

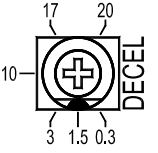


(Shown Factory Set to 1.5 Seconds)

7.4 DECELERATION (DECEL): Sets the amount of time for the motor to decelerate from full speed to zero speed. The DECEL Trimpot is factory set to 1.5 seconds. For longer deceleration time, rotate the DECEL Trimpot clockwise. For more rapid deceleration, rotate the DECEL Trimpot counterclockwise. See Figure 19.

Application Note: On applications with high inertial loads, the deceleration may automatically increase in time. This will slow down the rate of speed of decrease to prevent the bus voltage from rising to the Overvoltage Trip point. This function is called Regeneration Protection. It is recommended that for very high inertial loads that both the ACCEL and DECEL Trimpots be set to greater than 10 seconds.

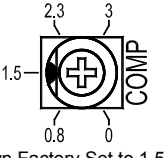
FIGURE 19 - DECELERATION TRIMPOT RANGE



(Shown Factory Set to 1.5 Seconds)

7.5 SLIP COMPENSATION (COMP): Sets the amount of Volts/Hz to maintain set motor speed under varying loads. The COMP Trimpot is factory set to 1.5 Volts/Hz, which provides excellent speed regulation for most motors. To increase the slip compensation, rotate the COMP Trimpot clockwise. To decrease the slip compensation, rotate the COMP Trimpot counterclockwise. See Figure 20.

FIGURE 20 - SLIP COMPENSATION TRIMPOT RANGE



(Shown Factory Set to 1.5 Volts/Hz)

The slip compensation may be adjusted as follows:

A. Connect an AC RMS ammeter in series with one motor phase.

B. Run the motor and set the unloaded speed to approximately 50% (900 RPM on 4-pole 1500/1725 RPM motors).

C. Using a tachometer, record the unloaded speed.

D. Increase motor loading until motor current is equal to the nameplate rated current (AC Amps).

E. Adjust the COMP Trimpot until the loaded RPM is equal to the unloaded RPM.

The motor is now compensated to provide constant speed under varying loads.

7.6 MOTOR OVERLOAD (I^2t) WITH RMS CURRENT LIMIT (CL)*: Sets the current limit (overload), which limits the maximum current to the motor, preventing motor burnout and eliminating nuisance trips. The CL Trimpot is factory set to 160% of the drive rated current. To increase the current limit, rotate the CL Trimpot clockwise. To decrease the current limit, rotate the CL Trimpot counterclockwise. See Figure 21.

FIGURE 21 – CURRENT LIMIT TRIMPOT RANGE

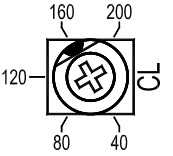


Figure 22, shows the I^2t Trip Time vs. Motor Current. Also see Section 5.2, on page 17.

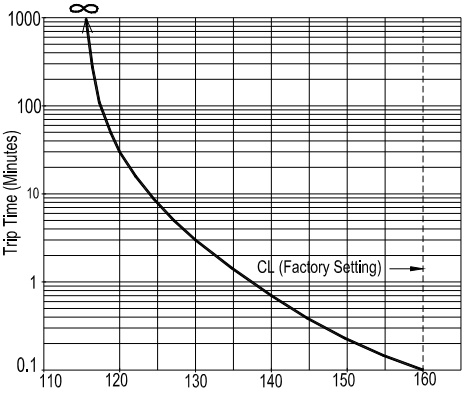
**UL approved as an electronic overload protector for motors.*

CAUTION! If the current limit is adjusted above 160% of the motor nameplate rating, this can cause overheating of the motor.

CAUTION! Do not leave the motor in a locked rotor condition for more than a few seconds since damage may occur.

Notes: ***1.*** *In order to ensure that the motor is properly protected with the I^2t feature, it is required that the CL Trimpot be set for 160% of the motor nameplate rated current, as described above.* ***2.*** *This adjustment must be made within 6 seconds or the I^2t Trip will occur.*

FIGURE 22 – I^2T TRIP TIME vs. MOTOR CURRENT



The current limit may be adjusted as follows:

A. Connect an AC RMS ammeter in series with one motor phase.

B. Set the CL Trimpot fully counterclockwise.

C. Adjust the speed setting to 30%.

D. Lock the motor shaft and adjust the CL Trimpot to 160% of the motor nameplate rated current.

8 DRIVE OPERATION

8.1 START-UP PROCEDURE: After the drive has been properly setup (jumpers and trimpots set to the desired positions) and wiring completed, the start-up procedure can begin.

WARNING! MAKE SURE THAT THE POTENTIOMETER IS SET FULLY COUNTERCLOCKWISE PRIOR TO APPLYING POWER. IF THIS IS NOT DONE, THE MOTOR WILL RUN AT THE SPEED SETTING AT POWER UP. THIS MAY CAUSE BODILY INJURY IF ONE IS IN CLOSE PROXIMITY OF MOVING PARTS.

To start the drive, set the On/Off AC Line Switch to the "ON" position. If the AC power has been properly brought to the drive, the Pilot Light will illuminate. If the optional Forward-Stop-Reverse Switch has been installed, set it to the "FWD" or "REV" position. The motor will begin to accelerate to the set speed. The PC board mounted "ST" and "OL" LED's will indicate the drive status, as described in Section 9.3 and 9.4 on page 25.

8.2 RESTARTING THE DRIVE AFTER A FAULT HAS BEEN CLEARED: The drive monitors four faults (Undervoltage, Overvoltage, Short Circuit (at the motor (phase-to-phase)), and Overload). The PC board mounted "ST" and "OL" LED's will indicate the drive status, as described in Section 9.3 and Section 9.4, on page 25. Also see Section 6.3, on page 19, for Automatic or Manual Start and Reset selection with Jumper J3. In addition, Section 10.2 on page 26.

WARNING! THE DRIVE WILL AUTOMATICALLY RESTART AFTER FAULT HAS CLEARED. IF AN I^2T OR SHORT CIRCUIT FAULT OCCURS, THE DRIVE MUST BE RESTARTED BY SETTING THE ON/OFF AC LINE SWITCH TO THE "OFF" POSITION FOR A MINIMUM OF 5 SECONDS.

8.2.1 Drive Set for Automatic Start and Reset (Factory Setting): The drive will automatically restart after an Undervoltage or Overvoltage Fault has cleared. For an I^2t Fault, be sure the fault has been cleared before restarting the drive. Check the motor current with an AC RMS responding ammeter. Also, the CL setting may be set too low. See Section 7.6, on page 23. For an I^2t or Short Circuit Fault, the drive must be restarted by setting the On/Off AC Line Switch to the "OFF" position for a minimum of 5 seconds.

8.2.2 Drive Set for Manual Start and Reset *:. In Manual Start Mode, the drive must be manually restarted after a fault has cleared, using the optional Forward-Stop-Reverse Switch. If a Short Circuit or I^2t Fault occurs, the drive must be restarted by setting either the On/Off AC Line Switch to the "OFF" position for a minimum of 5 seconds or setting the Forward-Stop-Reverse Switch to the "STOP" position.

** **Note:** The optional Forward-Stop-Reverse Switch must be installed in order to use the drive for Manual Start operation.*

9 PILOT LIGHT AND DIAGNOSTIC LED's

WARNING! DO NOT DEPEND ON THE PILOT LIGHT OR THE PC BOARD MOUNTED LED's FOR A GUARANTEED POWER OFF INDICATION. BE SURE ALL AC POWER IS "OFF" BEFORE SERVICING THE DRIVE TO AVOID ELECTRICAL SHOCK HAZARD.

9.1 PILOT LIGHT: The Pilot Light will illuminate orange when the AC line is applied to the drive and the On/Off AC Line Switch is set to the "ON" position.

9.2 POWER ON LED (ON): Located on the PC board, the "ON" LED will illuminate green when the AC line is applied to the drive and the On/Off AC Line Switch is set to the "ON" position.

9.3 STATUS LED (ST): Located on the PC board, the "ST" LED is a green LED, which provides indication of a fault or abnormal condition. The information provided can be used to diagnose an installation problem such as incorrect input voltage and drive output miswiring. It also provides a signal, which informs the user that all drive and microcontroller operating parameters are normal. Table 11, summarizes the "ST" LED functions.

9.4 OVERLOAD LED (OL): The "OL" LED is a red LED, which provides indication of an overload condition. Table 11, summarizes the "OL" LED functions.

TABLE 11 - DRIVE OPERATING CONDITIONS AND LED INDICATIONS

Drive Operating Condition	LED and Flash Rate[1] Information	
	ST (Green)	OL (Red)
Normal operation	Slow Flash	Off
Overload (120% - 160% Full Load)	Off	On[2]
I^2t (Drive Timed Out)	Off	Quick Flash
Short Circuit	Off	Slow Flash
Undervoltage	Quick Flash[3]	On
Overvoltage	Slow Flash[3]	On
Stop	On	On

***Notes: 1.** Slow Flash = 1 second on and 1 second off. Quick Flash = 0.25 second on and 0.25 second off. **2.** When the Overload is removed, before the I^2t times out and trips the drive, the "ST" LED will flash green and the "OL" LED will turn off. **3.** In Manual Restart Mode, when the Undervoltage or Overvoltage condition is cleared, the "ST" and "OL" LED's will flash red / (red and green) / green.*

10 TROUBLESHOOTING

WARNING! HIGH VOLTAGE IS PRESENT IN THIS DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. THE COVER MUST BE PROPERLY INSTALLED AFTER ALL SETUP, CONNECTIONS, AND ADJUSTMENTS ARE COMPLETE. IT REDUCES ELECTRICAL SHOCK HAZARD. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN ELECTRICAL SHOCK OR ELECTROCUTION.

WARNING! HIGH VOLTAGE IS PRESENT IN THE DRIVE. DISCONNECT MAIN POWER BEFORE MAKING CONNECTIONS TO THE DRIVE. DO NOT ADJUST TRIMPOTS WITH THE MAIN POWER APPLIED. IF ADJUSTMENTS ARE MADE WITH THE MAIN POWER APPLIED, AN INSULATED ADJUSTMENT TOOL (PROVIDED) MUST BE USED AND SAFETY GLASSES MUST BE WORN. FIRE AND/OR ELECTROCUTION CAN RESULT IF CAUTION IS NOT EXERCISED.

10.1 TROUBLESHOOTING GUIDE: Table 12, on page 25 provides information on symptoms, possible causes, and the suggested troubleshooting solutions for the drive. See Section 9, on page 24, for detailed information on LED status indicators.

10.2 FAULT RECOVERY: The drive monitors four faults (Undervoltage, Overvoltage, Short Circuit at the motor (phase-to-phase), and Overload). Section 8, on page 24, describes how the drive will automatically start (factory setting) after the fault has cleared.

Application Note: In Manual Start Mode, the drive must be manually reset for any fault. Use the Forward-Stop-Reverse Switch, as described in Section 8.2.2, on page 24. Also see Section 6.3, on page 19.

TABLE 12 - TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Suggested Solution
Line fuse blows or circuit breaker trips.	The line fuse or circuit breaker installed is the incorrect rating.	See Table 7, on page 6, for the correct line fuse or circuit breaker rating.
	Drive or Motor Failure.	Check and replace defective part.
Motor does not run.	On/Off AC Line Switch is in the OFF position.	Set the On/Off AC Line Switch to the ON position.
	The Main Speed Potentiometer is set to zero speed.	Set the Main Speed Potentiometer for the desired speed.
	The Main Speed Potentiometer, signal input, or motor connection are open.	Verify Main Speed Potentiometer, signal input, or motor connections.
	The Forward-Stop-Reverse Switch (when installed) is set to the "STOP" position.	Set the Forward-Stop-Reverse Switch to the "FORWARD" or "REVERSE" position.
Motor runs then stops after a short time.	The motor may be overloaded.	Check the motor current with an AC RMS responding ammeter. Reduce load.
	The Drive Trips due to overload (I^2t Fault).	The CL setting may need to be increased. See Section 7.6, on page 23.
		Verify Motor Horsepower Jumper, J2 is set correctly. See Section 6.2, on page 19.
		The drive must be manually restarted by either of the following methods: **1.** Disconnect and reconnect the AC power (the "ST" LED must change from quick flashing red to flashing red/yellow). **2.** Set the Main Speed Potentiometer to zero (fully counterclockwise). **3.** Open and close the Forward-Stop-Reverse Switch (or contact) or Run Switch (or contact). See Section 6.3, on page 19. Reduce load.
	The Acceleration setting may be too fast.	Reduce the ACCEL Trimpot setting, as described in Section 7.3, on page 22.
	Overvoltage Fault	Rapid Deceleration change. Verify drive setting. See Section 7.4, on page 22.
	Short circuit Fault.	Verify motor condition.

TABLE 13 - FAULT RECOVERY AND RESETTING THE DRIVE*

Fault	**Automatic Start Mode** (Factory Setting)
Undervoltage	Drive will ***automatically start*** after the bus voltage returns to the operational level or when the drive is first turned on (power up).
Overvoltage	Drive will ***automatically start*** after the bus voltage returns to the operational level.
Short Circuit	Drive will ***automatically start*** after the short circuit is removed.
I^2t	Drive must be ***manually restarted***.

The fault must be cleared before the drive can be reset.

10.3 STARTING THE DRIVE AFTER AN I^2t FAULT HAS BEEN CLEARED: The drive can be restarted after an I^2t Fault has cleared by any of the following methods.

Note: *If an I^2t Fault occurs, the motor may be overloaded. Check the motor current with an AC RMS responding ammeter. Also, the CL setting may be set too low. See Section 7.6, on page 23.*

10.3.1 Disconnect the AC power. Wait 15 seconds. Reconnect the AC power. The "ST" LED will change. Refer to Table 11, on page 25 for correct indication.

10.3.2 Set the Main Speed Potentiometer to zero (fully counterclockwise).

10.3.3 Open and close either the Forward-Stop-Reverse Switch (or contact) or Run Switch (or contact). See Sections 6.3.1, on page 20.

- Notes -

- Notes -

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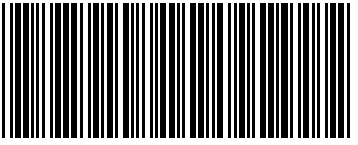

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(A40158) – Rev. A - 2/2008